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The Pan-Pacific Entomologist

Vol. XXXI January, 1955 No. 1

A REVISION OF THE NORTH AMERICAN SPECIES OF EUROPHILUS, A SUBGENUS OF AGONUM WITH A NOTE ON AGONUM BELLERI

(Coleoptera: Carabidae)

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Europhilus has often been treated as a separate genus (see Casey, 1920:125; Jeannel, 1942:890) but the characters distinguishing its members from *Agonum, s. str.*, are too insignificant. Furthermore, in the palaearctic fauna, *A. antennarium* Duftschmid and *sordidum* Dejean to some extent represent transitional forms (Müller, 1934:41). The main feature characteristic of the subgenus *Europhilus,* besides the pointed, not at all truncate tip of the last joint of the maxillary palpi, is the pubescence of the antennae, commencing on the third joint, whereas in the other subgenera of *Agonum* the third joint, except for the long terminal setae, is completely glabrous. As far as I know there are but four exceptions to this characteristic in the North American fauna, *viz., A. (Punctagonum) belleri* Hatch, *A. (Anchus) pusillum* LeConte, *A. (Stictanchus) anchomenoides* Randall, and *A. (Idiochroma) quadrimaculatum* Horn. All of these likewise possess a more expanded antennal pubescence. In *pusillum* and *quadrimaculatum* the prothorax has a shape quite different from *Europhilus,* in *belleri* and *anchomenoides* the terminal point of the maxillary palpi is evidently truncate at tip.

In spite of these exceptions any North American member of the subgenus *Europhilus* will be readily separated from other species of *Agonum, s.l.,* by the combination of pubescent third but glabrous second joint of the antennae, pointed last joint of the maxillary palpi and the glabrous elytra.

Also larval characters have been used for maintaining *Europhilus* as a genus separate from *Agonum* (Larsson, 1941:322). Particular attention has been placed upon the presence of one or more irregular incisions of the inner edge of the mandibulae outside the retinaculum, as well as upon the configuration of the frontal edge of the nasale (fig. 1). To my mind these characters,

though apparently constant, do not justify a more independent taxonomic position of *Europhilus* than of *Platynus, s. str., Anchus, Idiochroma,* etc., likewise generally treated as subgenera of *Agonum.*

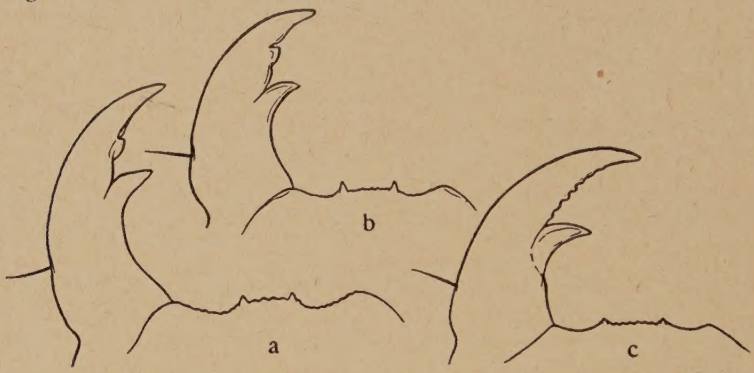

Fig. 1. Left mandibula and nasale of larva of: *a. Agonum (Europhilus) thoreyi* Dejean, 3rd stage (Denmark, Utterslev Mose), *b. Agonum (Europhilus) consimile* Gyllenhal, 3rd stage (Labrador, W. St. Modest), *c. Agonum s. str., ericeti* Panzer, 1st stage, greater magnification (Sweden, Södermanland, Ricksten, *ex ovo).*

In general habitus *Europhilus* agrees with *Agonum, s. str.* (type *cupripenne, melanarium,* etc.), but the size is usually smaller and the prothorax proportionally narrower, always impunctate. The number and position of dorsal setigerous punctures on or at the third interval of elytra is subject to considerable individual variation but the number seems never to be less than four.

A remarkable confusion is prevailing among North American *Europhilus* in public and private collections, as well as in the nomenclature of species. This is largely due to the unusual variability, in size, color, prothorax form, and other characteristics, displayed by most species. Furthermore, the form and sculpture of the penis, which provides such excellent taxonomic characters within the *Agonum, s.str.,* gives very little help in *Europhilus.* On the other hand, the microsculpture of elytra (investigated on the central part of the inner intervals), the position of the basal setigerous puncture of prothorax and the sulci of the hind tarsi, are useful and apparently rather constant characters. Even the colour of the antennae seems subject to little variation only.

Of the species included in this review I have seen all except

galvestonicum Casey (1920:126), described after a single male from Texas. I failed to study the type during my visit at the National Museum, Washington, because at that time I had no intention to make a complete revision of the subgenus. According to the description, and also the provenience, *galvestonicum* seems to be a distinct species.

Abbreviations used:

AMN=American Museum of Natural History, New York.
BMN=British Museum, Natural History, London.
DAO=Department of Agriculture, Ottowa.
MCZ=Museum of Comparative Zoology, Cambridge, Mass.
NMW=National Museum, Washington, D.C.
UMH=Zoological Museum, University, Helsingfors, Finland.
!=Specimen seen by the present author.

KEY TO THE SPECIES

1. Upper surface completely black with a more or less pronounced metallic lustre. Antennae and legs black (exceptionally the basal joint of antennae and the tibiae slightly piceous). 2
– At least the elytra not completely black or, if so, without metallic lustre (in one species slightly iridescent). First antennal joint and femora (often the whole legs) yellowish, brown or piceous. 4
2. Prothorax without trace of hind angles (fig. 2a). Microsculpture of elytra consisting of isodiametric meshes which show no tendency of forming transverse rows. ..... 1. *simile*
– Hind-angles of prothorax at least suggested. Microsculpture meshes of elytra more irregular, more or less transverse, and with tendency of arrangement in transverse rows. 3
3. Prothorax with obtuse but distinct hind-angles, the sides before them straight or even slightly sinuate (fig. 2c). First joint of hind-tarsi with lateral groove also on the inside. Antennae shorter..... 3. *exaratum*
– Hind-angles of prothorax suggested only (completely rounded, fig. 2b). First joint of hind-tarsi without (or with barely traceable) inside groove. ..... 2. *consimile*
4. Joints 2-4 of antennae darker than the following, almost black. All joints of hind-tarsi (besides the lateral groves of joint 1-4) with a sharp median carina. ..... 6. *gratiosum*
– No colour contrast between joint 4 and 5 of antennae. Last tarsal joint smooth above or with a median furrow. 5
5. Prothorax pale as the elytra, sharply contrasting against the black head. 6
– At least the disk of prothorax as dark as the head. 7
6. Eyes small and flat. ..... 8. *lutulentum*
– Eyes "very prominent." ..... *galvestonicum*

7. All joints of hind-tarsi (besides the lateral groves of joint 1-4) with a median furrow (best observed on the last joint).....4. *thoreyi*
– Tarsal joints smooth above. 8
8. Basal setigerous puncture of prothorax removed from side margin. Antennae (with very rare individual exceptions) with 3 pale basal joints and again paler at tip. Hind wings often reduced. .....5. *retractum*
– Basal setigerous puncture of prothorax touching the side margin. Only 1-2 basal joints of antennae pale. Wings always full. 9
9. The 8th stria of elytra deeply impressed in its whole length. The microsculpture of elytra consists of very fine and close transverse lines without tendency of forming meshes, elytra therefore slightly iridescent. .....10. *darlingtoni*
– The 8th stria shallower, especially in the middle. Microsculpture of elytra coarser, forming evident, more or less isodiametric meshes. 10
10. Eyes small and very flat. Prothorax not transverse, its narrowly reflexed lateral part barely enlarged towards the base. Microsculpture of elytra consisting of isodiametric meshes without tendency of forming transverse rows. .....9. *dilutipenne*
– Eyes strongly convex. Prothorax transverse, its side margin more widely reflexed towards the base. Microsculpture of elytra with more irregular meshes with slight tendency of forming transverse rows. ....4. *sordens*

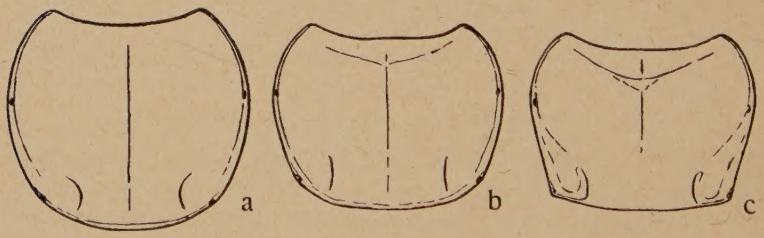

Fig. 2. Prothorax of: *a. Agonum (Europhilus) simile* Kirby (paratype). *b. Agonum (Europhilus) consimile* Gyllenhal (Labrador, Forteau), *c. Agonum (Europhilus) exaratum* Mannerheim (lecto-holotype). The hind-angles are not always equally prominent in *exaratum*.

1. Agonum (Europhilus) simile Kirby, 1837

Black with slight brassy lustre above. – The eyes less prominent than in the two following species. Prothorax (fig. 2a) very convex, oviform with completely disappearing hind-angles and only slightly deplanate around the shallow basal foveae. Elytra with more protruding shoulder part and more sinuate laterally before apex than in the two following species and therefore with more projected tip. The striae sharp but very fine, the intervals completely flat. Length 6.7 mm.

Only the two original ♀♀ known (BMN!). The locality was not stated but is probably situated somewhere at the North Saskatchewan River.

2. AGONUM (EUROPHILUS) CONSIMILE Gyllenhal, 1810

(invalidum Casey, 1924; ? *fragile* Mannerheim, 1853)

The identity of Casey's species was verified by examination of the male type from Edmonton, Alberta (NMW!).—The type of *fragile* Mannerheim could not be found (it is not in UMH) but the description, especially of prothorax, fits *consimile* very well.

Black with more or less pronounced metallic lustre above. The first antennal joint and the tibiae are occasionally slightly picescent (probably due to imperfect maturity). The antennae are slender, joints 4–10 with straight sides, 6–7 at least twice as long as wide. — Prothorax with obsolete hind-angles and slightly rounded sides in front of them. Elytra as a rule with almost flat intervals but the striae are always deeper than in *simile*. The only constant difference in penis from *exaratum* (and the palaearctic *munsteri* Hellén) is the very slight sinuation of the ventral side just before apex (fig. 3). Length 5.3–6.5 mm.

Distribution: Probably transamerican. I have seen it from Matanuska, Alaska, V.45 (J. C. Chamberlin, NMW!); Edmonton, Alberta (*"invalidum* Casey"); Churchill, Manitoba, VI,VIII.37 (W. J. Brown, DAO!); Ungava Bay, Quebec (L. M. Turner, NMW!); widely distributed in southeast Labrador, Cape Breton Island (Nova Scotia) and Newfoundland. Circumpolar in high latitudes.

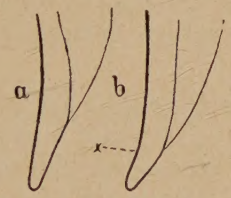

Fig. 3. Penis apex, left side view, of: *a Agonum (Europhilus) exaratum* Mannerheim, *b. Agonum (Europhilus) consimile* Gyllenhal, with the characteristic sinuation (x).

Ecology: This species is strongly hygrophilous. It occurs in wet bogs, as a rule close to the margin of pools and ponds, always on spots with Carex-vegetation and a dense carpet of mosses, but very seldom in Sphagnum, as on the whole it avoids the acid oligotrophic and dystrophic bogs. (Vide Lindroth, 1945:49). The larvae were found in company with the imago in Labrador and Newfoundland.

3. AGONUM (EUROPHILUS) EXARATUM Mannerheim, 1853

(aldanicum Poppius, 1906)

Generally shorter than *consimile*, with greatest width of elytra more

evidently behind the middle. Antennae (seen from the flat side!) shorter, outer joints (4 – 10) with rounded sides, almost ovato-oblong, 6 – 7 not at all twice as long as wide. – Prothorax varying but always with distinct hind-angles, the sides before them as a rule slightly sinuate or at least straight (fig. 2c). The elytral striae usually deeper with more convex intervals. Tarsal groves more distinct (wide key). The penis with completely straight ventral profile line (fig. 3). Length 5.2 – 6.2 mm.

The difference from *consimile* in the microsculpture of elytra, formerly used by me (1943:64) as a separating character, according to the large material now at disposal, seems not to be constant.

Distribution: Besides the two typical females from Kadjak, Alaska (UMH), I have seen a large series from Reindeer Depot, Mackenzie Delta, Northwest Territory, 28.VI.–12.VII.1948 (W. J. Brown, DAO!), and one small female from Baker Lake, Northwest Territory, 29.VIII.1930 (A. E. Porsild, MCZ!). In the palaearctic region the species is known from Lena River, Siberia (type locality of *aldanicum* Poppius), and from the Kanin and Kola Peninsulae in northern Russia (Lindroth, 1945:43–44). The ecology is not known.

4. Agonum (Europhilus) sordens Kirby, 1837

(picicorne LeConte, 1860; *frosti* Casey, 1924)

An examination of the type specimen of *sordens* (BMN!) contradicts the opinion of Chaudoir (in LeConte, 1869:248) that it should be the same as *retractum* LeConte. The type of *picicorne* (Alb.) and five additional specimens in the collection LeConte (MCZ) differ from *sordens* by the dark colour only; the penis is identical. The synonymy of *frosti* Casey was verified by examination of the type (♀, Maine, NMW!).

This species displays a great amount of variation in colour and in the form of prothorax and the penis is likewise slightly varying in length and acuteness of the apical part. But these variations are in no way coordinated and may occur even within one small population. Therefore, there is no reason for making a division into subspecies.

The upper surface, especially head and prothorax, often shows a clear metallic lustre. The elytra as a rule are paler than head and prothorax, often as bright as in *dilutipenne*, but sometimes quite dark (*"picicorne* LeConte"). In the palest form also the side margins of prothorax are reddish and the second antennal joint is almost as pale as the first. The prothorax is clearly transverse and in this respect, as in others, the species is very similar to *consimile*,

but the two species are sufficiently separated by colour characters (vide key) and furthermore *sordens* has a pronounced longitudinal groove also on the inside of the first joint of hind-tarsi (in *consimile* at most a trace of it). An examination of the penis fails to demonstrate any useful difference between *sordens* and *consimile* so the two species must be closely related. Length 5.3–6.5 mm.

Distribution: A transamerican species, occurring from Newfoundland and Labrador to Washington (Gray & Hatch, 1941) and British Columbia (coll. Fall, MCZ!).

Ecology: On moist, open places with sparse vegetation, often with tiny mosses on the ground (not *Sphagnum*), but not necessarily at the border of open water.

5. AGONUM (EUROPHILUS) RETRACTUM LeConte, 1848

(*collusor* Casey, 1920; *facile* Casey, 1920; *serenum* Casey, 1920)

The interpretation of the species (including genital slide) was made on LeConte's male type from Lake Superior (MCZ!). The synonymy of the three Casey species was verified by examination of the types (NMW!)

Piceous black, the outer margin of prothorax and the elytra as a rule paler. Legs and base of antennae, usually the 3 first joints, rufous. (In a dark specimen from Newfoundland the entire antennae are piceous.) Elytra shorter oviform, with more rounded sides, than in the other species. The tarsi are shorter compared with the tibiae than in any other species. From *gratiosum*, to which it bears the greatest resemblance, sufficiently separated by the tarsal sculpture and the colour of antennae (vide key), and also by the microsculpture of elytra forming more clearly transverse meshes which tend to be arranged in transverse rows. – The penis is slenderer, more arcuate, with more pointed apex. Concerning the wing dimorphism in this species, vide Darlington, 1936. Length 6.3–7.6 mm.

Distribution: Eastern States, Eastern Canada, west to Lake Superior.

Ecology: The habitat of this species is different from that of other American *Europhilus*. It is a true forest insect living independently of water in moderately moist debris of leaves, ferns, etc. in shady places under bushes and hardwood trees, in the company of *Calathus micropterus ingratus*.

6. AGONUM (EUROPHILUS) GRATIOSUM Mannerheim, 1853

(*picipenne* var. c, Kirby, 1837; *ruficorne* LeConte, 1850 *nec* Goeze, 1777; *lenum* or *lene* auct., e.g. Casey, 1920: 130, nec Dejean; *symmetricum* Casey, 1920; *properans* Casey, 1920; *antiquum* Notman, 1922; ? *carri* Casey, 1924)

As lecto-holotype I have selected a female labelled "*Anch. gratiosus* Mnh. Kadjak", Alaska (Holmberg, UMH!), as lecto-allotype

male an example from the same locality in collection LeConte (MCZ!). The latter has been compared and found identical with the type of *ruficorne* LeConte from Lake Superior (MCZ!). That Kirby's var.c of *picipenne*, characterized by the colour of antennae, belongs here, has been assumed by all students but, of course, his name cannot be used because the *f.typ.* is *thoreyi* (confirmed on the types in BMN!). Dejean's *lenum* likewise, mainly according to the description of the colour of antennae, must be referred to *thoreyi*. The two Casey names of 1920 (NMW!) as well as *antiquum* Notman (AMN!) were interpreted on the types. The latter name was established on an unusually narrow (immature and probably abnormal) form. As to *carri* Casey, unfortunately I made no note of it when studying the Casey collection and the synonymy with *gratiosum* here suggested is based on the description of the colour of antennae.

This species is easily recognized by the colour of antennae and the tarsal carina described in the key. The body is piceous black, the legs pale rufous. The microsculpture of elytra is more irregular and its meshes less pronounced isodiametric compared with *thoreyi* but the tendency of forming transverse rows is less evident than in *retractum*. The wings are always fully developed, with reflexed apical part, but comparatively so weak and small that the insect probably lacks the power of fllight. Length 6.7–9.1 mm.

Distribution: Transamerican. Described from Alaska, also known from British Columbia (MCZ!DAO!), Northwest Territory (Fort Simpson, Coll. LeConte!) and Washington (Gray & Hatch, 1941). Common in the East, north to south Labrador.

Ecology: This species usually lives on firmer and drier ground than the other members of the subgenus, but as a rule in the neighborhood of standing waters. It prefers open, often clayish or peaty ground with short sparse vegetation of grasses, Carices, etc.

7. Agonum (Europhilus) thoreyi Dejean, 1828

(lenum Dejean, 1828; *picipenne* Kirby, 1837; *gemellum* LeConte, 1879)

Dejean's *lenum* has usually been associated with *gratiosum* (or any of its synonyms), first by Chaudoir (in LeConte, 1869:248), later by Casey (1920:130). But it is not clear whether Chaudoir studied any typical specimen of *lenum*, or not. At any rate Dejean's careful description of the colour of antennae excludes *gratiosum* and, as far as I can see, *lenum* can be applicated to no other North American *Europhilus* than *thoreyi*. The characters mentioned by

Dejean as separating *lenum* from his *thoreyi*, including *puellum*, both described in the same paper (1828), are unimportant in this unusually variable species. Kirby's *picipenne (f. typ.)* has been generally misinterpreted (concerning his "var.c", *vide gratiosum)*. LeConte first put it to *lutulentum* (1873:323), later to *dilutipenne* (1879:58). Only Casey (1920:127) used the name for *thoreyi* (verified in his collection, NMW!). I have seen the type of *picipenne* (BMN!). The identity of *gemellum* LeConte was verified by examination of the male type from Vancouver, British Columbia (MCZ!), including a genital slide.

Thoreyi is easily distinguished from all other members of the subgenus by the median furrow of its hind-tarsi, including the last joint. The closest relatives are *lutulentum* and *dilutipenne*, with similar form of head and prothorax, which agree in the perfectly isodiametric microreticulation of elytra. Length 6.4–8.7 mm.

The form occurring in North America is "*puellum* Dejean", with uniformly dark upper surface. The "*f.typ.*", with pale elytra, is strictly palaearctic.

Distribution: Transamerican, west to California (MCZ!), Washington (Gray & Hatch, 1941), British Columbia (MCZ!DAO!), Alaska (Matanuska, NMW!), north to Northwest Territory (Norman Wells, DAO!).

Ecology: In *Carex* swamps and on the border of eutrophic ponds, on very wet spots with high, close vegetation, but without a too dense carpet of mosses (never in Sphagnum).

8. AGONUM (EUROPHILUS) LUTULENTUM Le Conte, 1854

(elegantulum Casey, 1920; *adustum* Casey, 1920; *atriceps* Casey, 1920)

The two first-named Casey synonyms were originally (1920:127) described as subspecies of *lutulentum*, later (1924:85) the author declared *elegantulum* as a synonym whereas *adustum* was elevated to specific rank. Now, *lutulentum* is an extremely variable species as regards proportions of body and brightness of colour, that is in the characters mainly used by Casey, and this even within one and the same small population, so they cannot be used even for erecting subspecies. Casey's *adustum* and *atriceps*, in narrowness of the body, only represent the extremes in this continuous series of variation. The specific identity of *elegantulum* and *adustum* with *lutulentum* was stated by myself in the Casey collection (NMW). I failed, on that occasion, to make any note as to *atriceps* but later sent some notably broad specimens of *lutulentum* to Dr. R. F.

Blackwelder who, comparing them with the type, could find no consistent deviation from *atriceps*.

Lutulentum at the first glance differs from all other American *Europhilus* (except *galvestonicum*) by the equally pale (piceo-testaceous or paler) prothorax and elytra, constrasting against the deep black head. It agrees with *dilutipenne* and, to a lesser degree, *thoreyi* in the narrow head with flat eyes, the feebly reflexed sides of prothorax and the isodiametric microreticulation of elytra. Length 5.9–7.0 mm.

Distribution: Eastern States and Eastern Canada, west to Lake Superior and Hudson Bay Territory; Washington (Gray & Hatch, 1941). Probably transamerican.

Ecology: On very wet places at the edge of lakes, ponds and pools with dense and rich *Carex* vegetation.

9. AGONUM (EUROPHILUS) DILUTIPENNE Motschulsky, 1864
(elongatulum Haldeman, 1843 *nec* Dejean, 1828; *lene* LeConte, 1848 *nec lenum* Dejean, 1828; *picipenne* LeConte, 1879 *et auct., nec* Kirby, 1837)

On the interpretation of *lenum* Dejean and *picipenne* Kirby, *vide thoreyi*.

Constant in colour: head and prothorax black without metallic reflection, elytra piceo-testaceous. From *sordens*, which normally has a similar coloration, distinguished by characters mentioned in the key and also by the regular isodiametric microreticulation of elytra. In *sordens* the upper surface usually shows a slight metallic lustre.

Dilutipenne is very closely related to *lutulentum* and no differences could be seen in the male genitalia. The difference in colour is apparently constant. Furthermore, in *dilutipenne* the prothorax is strongly microreticulated all over its surface (in *lutulentum* obsoletely so in centrum of the disc) and the meshes are less transverse, almost isodiametric. Finally, in *dilutipenne* the posterior setigerous puncture of prothorax is situated close to the side-margin, in *lutulentum* slightly removed from it. *Thoreyi*, agreeing in the form of prothorax as well as in the microreticulation of elytra, is larger and darker and differs also by the grooves of the hind-tarsi. Length 5.9–6.5 mm.

Distribution: Eastern States and Eastern Canada, west at least to Lake Superior, south to New Mexico.

Ecology: Habitat as *lutulentum*, in company of which it often occurs.

Fig. 4. *Agonum (Europhilus) darlingtoni* new species. Paratype from Halifax, Nova Scotia.

10. Agonum (Europhilus) darlingtoni Lindroth, new species

(Figure 4)

Black, elytra iridescent, often slightly piceous, the epipleura reddish towards apex. Mouth-parts pale, antennae piceous or nearly black, their first joint and the entire legs pale reddish. Eyes small but prominent. Prothorax oviform without traces of hind-angles. Elytra with strong, impunctured striae, evident to apex, the 8th deeply impressed in its whole length, the intervals slightly convex. Dorsal punctures inconspicuous, 4 in number, the 2 anterior at the third, the 2 posterior at the second stria. The microsculpture of elytra consists of dense, fine, transverse lines. The 3 basal joints of hind-tarsi with evident lateral and barely visible traces of inside longitudinal groove. Wings fully developed. Penis (fig. 5). Length 4.9–5.9 mm.

Fig. 5. Penis of *Agonum (Europhilus) darlingtoni* new species, paratype from Lexington, Mass.

At once recognized by the impressed eighth stria and the transverse microsculpture of elytra. In the latter respect this species deviates also from all known palaearctic species of *Europhilus*.

Distribution: Holotype male, *allotype* female and 11 paratypes from LEXINGTON, MASSACHUSETTS, IV.,V.1926,VIII.1930 (P. J. Darlington Jr., MCZ); two paratypes male Groton, Connecticut, 23.V.,4.VI.1948 (Anton Janssson); one paratype male Sackville, Halifax, Nova Scotia, 20.V.1951 (Lindroth).

Ecology: Dr. Darlington informs me that he collected his specimens in very wet moss at the border of a pond. The data suggest that the species is an imaginal hibernator.

APPENDIX

AGONUM (PUNCTAGONUM) BELLERI Hatch

Already in the original description Hatch (1933:120) drew attention to the fact that this peculiar species, deviating from all other nearctic *Agonum, s.str.*, by the setigerous punctures of the alternate elytral intervals, is also characterized by the pubescence of antennae starting already on the third joint, almost as in *Europhilus*. Later, on these two characters, Gray (1937:311; *vide* also Gray & Hatch 1941:24) established the new subgenus *Punctagonum*.

Now *belleri*, in all other respects, comes extremely close to *Agonum, s.str., ericeti* Panzer *(bifoveolatum* Sahlberg) from Europe and west Siberia. In fact, I am unable to separate the two insects on any other character, except that the antennal joints are a little shorter in *belleri*. Penis and parameres (investigated on two paratypes of *belleri* and two European *ericeti*) are identical. Even the reduction of the hind wings (narrower than one elytron but about as long, with very feeble, incompletely reflexed apical part) is exactly the same. The ecology of the two species (Hatch, 1933; Lindroth, 1945:55) is likewise completely agreeing.

If possible the comparison between *belleri* and *ericeti* should be extended to larval characters. In case the immature stages of the former should be found I here give a drawing of mandibula and nasale of the first stage larva of *ericeti* (fig. 1c).

As far as I can see, it is even doubtful whether *belleri* should not be regarded as a subspecies of *ericeti*. This may sound absurd, considering the very peculiar feature of pubescent elytra and third antennal joint in *belleri*. But both of these characters, seemingly unconnected, may be the result of a single gene. An equivalent case represents the subgenus *Anchus*. As stated by Hatch (1933: 121) the American *pusillum* LeConte is distinguished from the palaearctic *obscurum* Herbst (under which name it wrongly long passed) by the pubescent intervals of elytra, but at the same time it shows a pubescence on the basal joints of antennae, lacking in *obscurum*. Now, in this case there are also other differences, above all in the penis, so the specific separation is indisputable. But I do not think anybody would be inclined to refer *pusillum* and *obscurum* to different subgenera.

Finally, it is worth paying attention to the fact that a flightless, highly stenotopic species like *ericeti* must be predestinated to form small, isolated populations suited for the rapid maintaining of mutants, also of a non-adaptive character.

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A CHANGE OF NAME IN CHRYSOBOTHRIS

(Coleoptera, Buprestidae)

In U.S.D.A. Misc. Pub. No. 470, Sept. 1942 (Rev. N. A. Chrysobothrini), on page 40, W. S. Fisher proposed the name *Chrysobothris chamberlini* for *C. calcarata* Chamberlin, pointing out that the name *C. calcarata* had previously been used by Melsheimer for a species from Pennsylvania. In Sbornik entom. odd. Nar. Musea v Praze, 1940, vol. 28, p. 93, J. Obenberger used the name *Chrysobothris chamberlini* for a species from California allied to *C. distincta*. Since these species are members of the same genus, I propose that the form previously known as *C. calcarata* Chamberlin and then as *C. chamberlini* Fisher now be called **Chrysobothris trinuncupata** Helfer, new name.—J. R. HELFER, *Mendocino, California.*

TWO NEW SPECIES OF PLEGA FROM MEXICO

(Neuroptera, Mantispidae)[1]

E. G. LINSLEY and J. W. MACSWAIN
University of California, Berkeley

The following descriptions are offered at this time in order that the names may be available for use in connection with biological studies to be published elsewhere.

Plega melitomae Linsley and MacSwain, new species

Coloration generally similar to other species in the genus but with less extensive dark areas. Head with heavily pigmented areas reduced, absent from clypeus and labrum, more lightly pigmented areas variable (figures 4, 5); antennae with scape pale, pedicel darker, flagellar segments one to fourteen pale, fifteen to twenty-six successively more piceous, segments twenty-seven to thirty-one luteus, remaining segments piceous. Thorax (figure 1) with pronotum pale, the usual maculations present but reduced except for the basal collar which is predominantly dark; pterothorax pale but with more extensive dark areas than pronotum. Wings hyaline; veins and setae predominantly pale; stigmatic area of both anterior and posterior wings with median pale area distinctly larger than either adjacent dark area. Legs pale, dark markings as in other species except inner surface of anterior femora which is marked similarly to outer surface. Abdomen dark, pleural area of first two segments yellow, remaining segments with a postero-dorsal yellow spot and a ventral longitudinal yellow line; tenth tergite of male yellow with a small mid-lateral dark area, of female dark with discal area yellow; sternites margined posteriorly with a narrow white band, discal area yellowish, yellow area expanded on first two segments; ovipositor of female yellow, longitudinal midlateral line dark.

Male: Length of body 11 mm., anterior wing 13 mm., posterior wing 10 mm. Head, especially ante- and post-clypeus, sparsely transversely rugulose; mid-frontal line, below coronal suture, scarcely evident: antennae (figure 13) slender, flagellum 40-segmented, evenly, gradually tapered from base to apex, segments cylindrical, apical segments longer than broad, slightly more than half the diameter of basal segments, basal segments as long as broad, setal pattern as illustrated (figure 13). Wings (figures 2, 3); anterior wing with eight longitudinal veins arising from radial sector, usually four from inner radial cell and four from outer radial cell, gradate veins ten; posterior

[1] One of a series of studies made possible by a grant-in-aid from the Associates in Tropical Biogeography, University of California.

wing with six longitudinal veins arising from radial sector, usually five from inner radial cell and one from outer radial cell, gradate veins seven. Legs with anterior coxae cylindrical, six times as long as broad, densely clothed with long, erect, fine hairs rather than coarse setae. Parameres (figure 9), only slightly arcuate, with three very short apical digitiform processes and a single longer subapical process.

Female: Length of body 8.5 mm., anterior wing 12 mm., posterior wing 9 mm. Structurally similar to male except for terminal abdominal segments; ovipositor S-shaped, about three-fourths as long as abdomen.

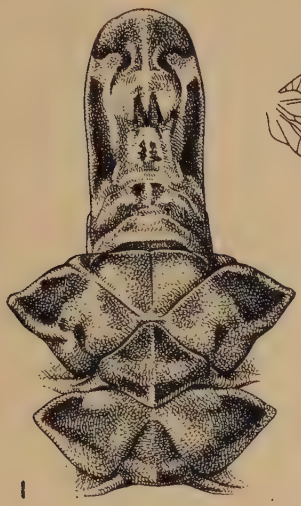
Holotype male (Calif. Acad. Sci., Ent.), allotype female (Calif. Acad. Sci., Ent.) and sixteen paratypes (9♂♂, 7♀♀), reared on various dates in July, 1953 from cells of *Melitoma euglossoides* Lepeletier and Serville collected at FRANCIA, 8 MILES NORTHEAST OF CINTALAPA, CHIAPAS, MEXICO, April 3, 1953, by R. C. Bechtel and E. I. Schlinger. Paratypes deposited in the collections of the California Academy of Sciences, the California Insect Survey, the Museum of Comparative Zoology and the Academy of Natural Sciences of Philadelphia.

This species is readily separable in both sexes from the other described *Plega* occurring in North and South America by the venation of the anterior and posterior wings. Other distinctive features are the shape and number of the antennal segments, the generally paler coloration with reduced pigmented areas, and the structure of the male parameres.

Plega fumosa Linsley and MacSwain, new species

Coloration generally dark. Head predominantly piceous with pale areas as illustrated (figure 6); antennae with scape more or less pale, pedicel and flagellum piceous. Thorax with dorsal surface of pronotum dark except for yellowish posteriorly and postero-laterally, lateral surfaces with posterior two-thirds yellowish, basal collar yellow; pterothorax black except for the anterior lateral arm of the second prescutum, the ventral margins of the anepisterna and the postero-ventral angles of the katepisterna, which are yellow. Wings subhyaline, veins and setae predominantly black; stigmatic area of both anterior and posterior wings with median pale area greatly reduced in relation to adjacent dark areas, medially placed in anterior wing, post-medially in posterior wing, in the latter case rarely absent. Legs pale with dark markings;

Plate I. *Plega melitomae* Linsley and MacSwain and *Plega fumosa* Linsley and MacSwain: Structural details.



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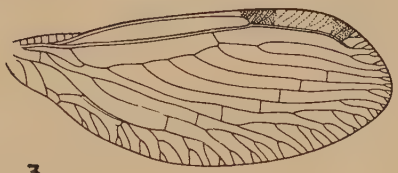

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Plega melitomae

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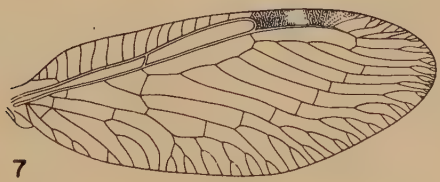

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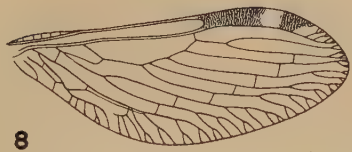

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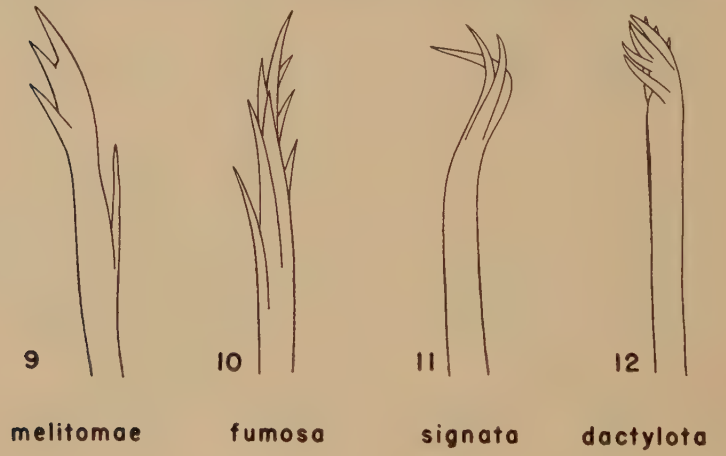
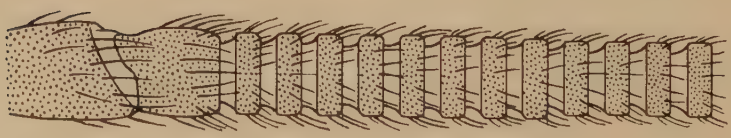
Plega fumosa

anterior coxae dark piceous; anterior femora with inner surface uniformly dark piceous. Abdomen dark; pleural area dark, margined above and below with yellow; tenth tergite of male yellow except basally, of female dark; sternites of male dark except for yellow midline of segments one to four, of female dark with slightly paler discal and postero-lateral angles of segments three to six; ovipositor of female piceous, somewhat paler at base and apex.

Male: Length of body 11 mm., anterior wing 11.5 mm., posterior wing 8.5 mm. Head, especially ante- and post-clypeus, distinctly transversely rugulose; mid-frontal line, below coronal suture, broadly impressed; antennae (figure 14) submoniliform, flagellum at least 52-segmented (incomplete in type and male paratypes), subapical segments as long as broad, basal



13 melitomae



14 fumosa

Plate II. *Plega* species: Male antennae and parameres.

segments twice as wide as long, setal pattern as illustrated. Wings (figures 7, 8); anterior wing with seven longitudinal veins arising from radial sector, four from inner radial cell, three from outer, gradate veins nine; posterior wing with five longitudinal veins arising from radial sector, four from inner radial cell, one from outer, gradate veins seven. Legs with anterior coxae cylindrical, six times as long as broad, densely clothed with moderately long erect fine hairs. Parameres (figure 10), only slightly arcuate, with eight elongate closely appressed digitiform processes with the apices divergent.

Female: Length of body (excluding ovipositor) 11 mm., anterior wing 13 mm., posterior wing 10 mm. Structurally similar to male except for terminal abdominal segments; antennae with fifty-nine flagellar segments, basal segments slightly less than twice as wide as long; ovipositor nearly straight, about as long as abdomen.

Holotype male (Calif. Acad. Sci., Ent.), allotype female (Calif. Acad. Sci., Ent.) and twenty-three paratypes (3♂♂, 20♀♀), from 11 MILES EAST OF APATZINGAN, MICHOACAN, MEXICO, August 20, 1954, (E. G. Linsley, J. W. MacSwain, and Ray F. Smith), beaten from an *Acacia*-like legume upon which three species of *Polistes* were nesting. Dissections of more than one hundred of these nests revealed no evidence of parasitic association, but this may not be significant since the wasps were rearing their first brood and the mantispids were freshly emerged.

Paratypes deposited in the collections of the California Academy of Sciences, the California Insect Survey, the Museum of Comparative Zoology and the Academy of Natural Sciences of Philadelphia.

This species is distinctive in both sexes by the dark pigmentation. The structure of the male parameres, while suggestive of that in *Plega banksi* Rehn, differs in number of digitiform processes which also have the apices divergent.

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ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.[N.S.]20)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Parts 10 and 11 of the Bulletin of Zoological Nomenclature, each of which Parts will be published on 30th December, 1954:—

(1) Applications in Part 10 of Volume 9

(1) *rufa* Linnaeus, 1761, as published in the combination *Formica rufa*, proposed validation of, and designation as type species of *Formica* Linnaeus, 1758 (Class Insecta, Order Hymenoptera) (pp. 309–318) (Z.N.[S.]776).

1. The present Notice is given in pursuance of decisions taken, on the recommendation of the International Commission on Zoological Nomenclature, by the Thirteenth International Congress of Zoology, Paris, July 1948 (see Bull. Zool. Nomencl. 4:51–56; ibid. 5:5–15, 131).

2. Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1., England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice.

3. If received in sufficient time before the commencement by the International Commission of voting on the applications in question, comments received in response to the present Notice will be published in the *Bulletin of Zoological Nomenclature;* comments received too late to be so published will be brought to the attention of the International Commission at the time of commencement of voting on the application in question.

4. Under the decision by the International Congress of Zoology specified in paragraph 2 above, the period within which comments on the applications covered by the present Notice are receivable is a period of six calendar months calculated from the date of publication of the relevant Part of the *Bulletin of Zoological Nomenclature.*

A TAXONOMIC AND DISTRIBUTIONAL STUDY OF THE SPECIES OF PRODENIA OCCURRING IN CALIFORNIA

(Lepidoptera: Phalaenidae)

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The bulk of the material presented in this paper was gathered in 1948 and 1949 in the course of investigations on the bionomics of the important crop pest *Prodenia praefica* Grote, the western yellow-striped armyworm, *P. praefica* and the closely allied *P. ornithogalli* Guenée, the yellow-striped armyworm, are the only species of *Prodenia* which occur in California. In the past a certain amount of confusion has existed as to the taxonomic and distributional relationships of the two species, and it is hoped that this paper will help to clarify this situation.

The genus *Prodenia* contains nine species, the majority of which occur in tropical and subtropical America. The species included in the genus in addition to *praefica* and *ornithogalli* are *rubrifusa* Hampson; *dolichos (Fabricius); pulchella* Herrich-Shaffer; *androgea* (Cramer); *litura (Fabricius); marima* Schaus; and *latifascia* Walker. Of these species only *praefica, ornithogalli, dolichos,* and *latifascia* have been recorded from the United States, the latter being a doubtful record. *P. litura* is the only species which occurs outside the western hemisphere. It is found widely distributed throughout the old world tropics and subtropics where it is of great economic importance on a variety of crops. It is not known to occur in the western hemisphere.

KEY TO THE CALIFORNIA SPECIES OF PRODENIA

1. Posterior wings dull, somewhat fuscous with distinct discal spots on ventral surfaces; forewings with apical fasciae inconspicuous; male clasper with relatively short thick uncus, ampullae short, truncate (Fig. 1C); mature larva with head capsule heavily reticulated (Fig. 1A).....*praefica* Grote.
   Posterior wings semi-hyaline, discal spots absent; forewings with apical fasciae conspicuous; male clasper with relatively long slender uncus, ampullae slender finger-like (Fig. 1D); mature larva with head capsule faintly reticulated (Fig. 1B).....*ornithogalli* Guenée.

PRODENIA PRAEFICA Grote

Prodenia praefica Grote, 1875, Canad. Ent. 7:44; 1882, Check List Macrolepid. Amer. N. of Mex., Brookl. Ent. Soc., pg. 14; Smith, 1893, U. S. Nat. Mus. Bull. 44:170; Hampson, 1909, Cat. Lep. Br. Mus. 8:250 pl. 128,

fig. 20; Woodworth, 1911, Mon. Bull. St. Comm. Hort. Calif. *1*(10):788; Barnes and McDunnough, 1917, Check List Lepid. Bor. Amer., pg, 67; Seitz, 1923, Macrolep. World div. 2 vol. 7:256, fig. 373; Barnes and Benjamin, 1924, Contr. Nat. Hist. Lep. N. Amer. *5*(2):80–81; Crumb, 1927, Bull. Brookl. Ent. Soc. 22(1):43. 52 pl. 4a; Blanchard and Conger, 1932, Jour. Econ. Ent. *25*(5):1059–1070; McDunnough, 1938, Mem. So. Calif. Acad. Sci. *1*(1):96; McDunnough, 1943, Canad. Ent. *75*(1):1.

Prodenia ornithogalli praefica, Dyar, 1902, U. S. Nat. Mus. Bull. 52:123.

Female: Head, mottled with white, grey and black scales; antennae clothed with flat white or brown scales on anterior surfaces, posterior surfaces with fine short hairs only. Thorax concolorous with head except for some rufous scales. Forewing brownish or brownish grey in general coloration, marked with white, black, and bluish areas; median vein and its branches whitish at region of orbicular stigma, forming a conspicuous white patch with the orbicular; reniform stigma creamy white or brownish with a white margin; apical fascia narrow, inconspicuous, outer margin of wing marked by broken white and black lines, ciliae brown except at tips of main veins which are white. Ventral surface of forewing greyish white, moderately infuscated, a strong black spot in midcostal region; forewings about 40 to 46 mm. when spread. Posterior wings dull greyish white in aspect, dorsal surface faintly to strongly infuscated, a continuous or broken black line at margin, veins brownish black. Ventral surface dull whitish, speckled with black especially in costal region, clothed with coarse flat scales, a distinct black discal spot present. Legs greyish white with small black areas on tarsal segments. Abdomen greyish dorsally, venter dull white sparsely speckled with black, terminal segments heavily clothed with downy black scales, closely surrounded by long yellowish scales.

Male: Similar to female but usually more brightly colored with the bluish and brown areas of the forewing less somber, apical fasciae more conspicuous, posterior wings only weakly infuscated.

Adult variation: In addition to the typical adult specimens discussed above, a melanistic form also exists. This dark form is only encountered early in the year when moths are emerging from overwintering pupae. Specimens of both sexes are dark bluish grey in gross appearance with conspicuous white orbicular patches on the forewings. The head, abdomen and thorax are uniformly dark grey in color and contrast strongly with the buff color of these body regions in typical specimens. The posterior wings in both sexes are much darker than in the typical form.

Mature Larva: Smooth, meso and metathoracic segments and 7th and 8th abdominal segments slightly swollen, ground color of body reddish or greyish brown mottled with white. Head capsule, approximately 2.5 mm. in width, ground color brownish to brownish orange heavily reticulated with blackish or reddish markings, adfrontal sutures and areas yellowish white forming a conspicuous inverted V. Length of the sixth instar larva ranges from 20 to 46 mm.

Larval Variations: A variety of color phases occur ranging from almost pure creamy white to black with yellow subdorsal stripes. The dark phase is most common and is marked laterally with pale supra and sub-spiracular lines and dark spiracular lines in addition to the yellow subdorsal lines. Paler specimens of the dark phase

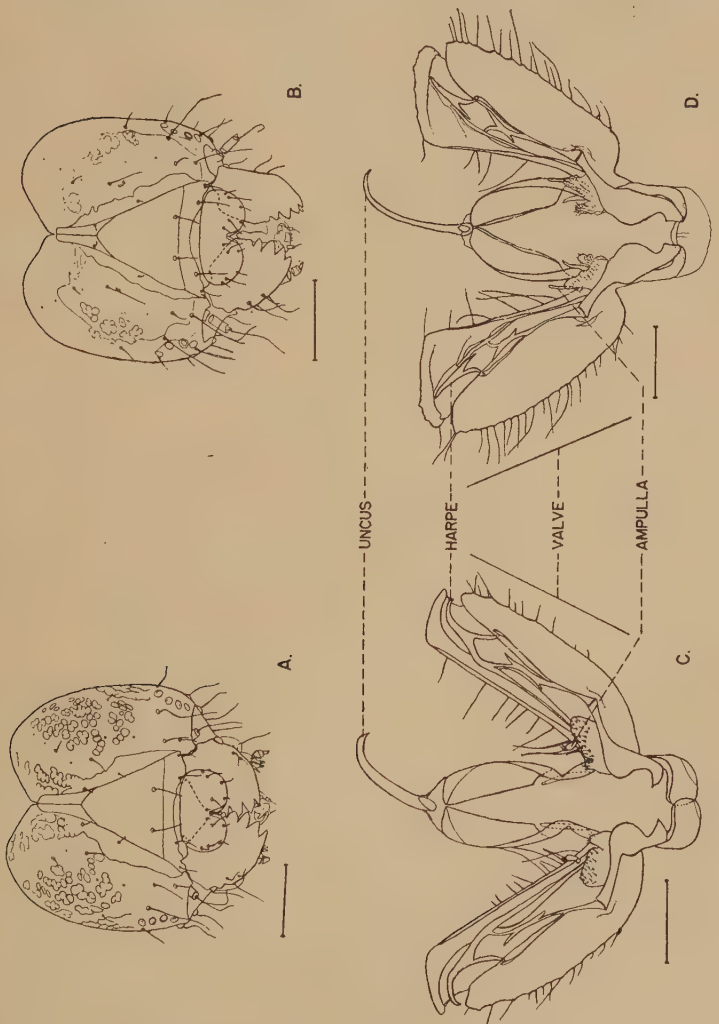


Fig. 1.—A) *Prodenia praefica* Grote, head capsule mature larva; B) *P. ornithogalli* Guenée, head capsule mature larva; C) *P. praefica* Grote, male clasper; D) *P. ornithogalli* Guenée, male clasper. [Lines at lower left in each figure represent 1 mm.]

frequently bear series of triangular black marks medial to the yellow subdorsal lines. Dark lateral markings on the thoracic segments are also sometimes conspicuous along with more or less characteristic round dark spots in the spiracular line on each side of the first abdominal segment.

Location of Type: British Museum of Natural History.
Type Locality: Mendocino City, California.

PRODENIA ORNITHOGALLI Guenée

Prodenia ornithogalli Guenée, 1852, Sp. Gen. Lep. Noct., 1:163; Walker, 1856, Cat. Lep. Het. Br. Mus., 9:193; Riley, 1882, Papilio 2(3):43; 1882 Check List Macrolepid. of Amer. N. of Mex., Brookl. Ent. Soc., pg. 14; Smith, 1893, U. S. Nat. Mus. Bull. 44:169–170; Dyar, 1902, U. S. Nat. Mus. Bull. 52:123; Beutenmueller, 1902, Amer. Mus. Nat. Hist. Bull. vol. 16, art. 33:422–423; Hampson, 1909, Cat. Lep. Phal. Br. Mus. 8:242, 248–250 pl. 128 fig. 19; Woodworth, 1911, Calif. St. Comm. Hort. Mon. Bull. *1*(10):788; Barnes and McDunnough, 1917, Check List of Lepid. of Bor. Amer., pg. 67; Seitz, 1923, Macrolepid. World div. 2 vol. 7:256, pl. 37D; Crumb, 1927, Bull. Brookl. Ent. Soc. *22*(1):43, 51–52, pl. 4B and 5D; Crumb, 1929, U.S.D.A. Tech. Bull. 88:149–156 (illustrated); Whalen, 1930, Penn. St. Agr. Expt. Sta. Bull. 335:80; McDunnough, 1938, Mem. S. Calif. Acad. Sci. *1*(1):96; McDunnough, 1943, Canad. Ent. *75*(1):1.

Prodenia ornithogalli eudiopta, Dyar, 1902, U. S. Nat. Mus. Bull. 52:123.

Prodenia eudiopta Guenée, 1952, Sp. Gen. Lep. Noct. 1:164; Walker, 1856, Cat. Lep. Het. Br. Mus. 9:193; Beutenmueller, 1902, Amer. Mus. Nat. Hist. Bull. Vol. 16, art. 33:423–424; Smith, 1893, U. S. Nat. Mus. Bull. 44:170; Chittenden, 1901, U.S.D.A. Div. Ent. Bull. 27 (rev. ed.) :64, 75, 114; Tietz, 1936, Penn. St. Agr. Expt. Sta. Bull. 335:80.

Prodenia flavimedia Harvey, 1874, Bull. Buff. Soc. Nat. Sci. 2:274; 1882, Check List Macrolepid. of Amer. N. of Mex., Brookl. Ent. Soc., pg. 14.

Prodenia lineatella Harvey, 1874, Bull. Buff Soc. Nat. Sci. 2:275; French, 1881, Canad. Ent. 13:24; Grote, 1881, Papilio. *1*(8):128; 1882, Check List Macrolepid of Amer. N. of Mex., Brookl. Ent. Soc. pg. 14.

Prodenia commelinae Riley, 1871, 3rd rept. Ins. Mo. :113, fig. 48b (1871); Grote, 1875, check list Noct. :11.

Prodenia praefica form *eudioptoides* Barnes and Benjamin, 1923, Contr. Nat. Hist. Lep. N. Amer. *5*(2):81; Seitz, 1923, Macrolepid. World div. 2 vol. 7:256, pl. 37E.

Female: Similar to *praefica* but somewhat less somber; the apical fascia and white markings of forewing usually more distinct. Secondaries clothed with tiny scales giving them a semi-hyaline and somewhat violaceous appearance, infuscation only in costal region and along outer margin. Veins brownish, discal spot wanting.

Male: Pale bodied, forewings rather brightly colored, with strongly produced apical fasciae; area posterior to the reniform stigma in some specimens orange brown. The outer costal margin and inner margin rufous,

costal area of ventral surface also rufous; secondaries similar to those of female but with less extensive infuscation at apical angle. Abdomen ochreous white, venter speckled with rufous.

Larva: Similar to that of *praefica* but with greatly reduced reticulation on head capsule.

Type Locality: Central America.

Location of Type: Unknown.

Fig. 2. Distribution of *Prodenia praefica* Grote (open circles) and *Prodenia ornithogalli* Guenée (solid circles) in the western United States.

Geographical Distribution

Prodenia praefica and *P. ornithogalli* differ greatly in distribution with the latter having much the wider range. *P. ornithogalli* occurs in South and Central America, Mexico, and the islands of the Carribean as well as the United States. In the United States it occurs abundantly in the Southeast and has been encountered as far north as Minnesota and Massachusetts and as far west as California, but not in the Northwest (See fig. 2.).

The range of *P. praefica* is apparently limited to western North America. It has been recorded as far north as central Oregon and Montana, as far south as San Diego on the southern border of California, and as far east as Colorado. No records are available which indicate that it occurs in the southwestern states but it possibly exists in low abundance in the northwestern part of Arizona.

Because of the confusion which has existed in the literature as to the distribution of these species in the West, and because of the significance of this in the interpretation of the relationships of the two forms, intensive studies were conducted during 1948 and 1949 in California to determine as precisely as possible the distribution of *P. praefica* and *P. ornithogalli* within the state. These studies were carried out by means of several sampling devices and methods. The most useful was a monochromatic electrocutor type light trap using a pale blue spiral gas discharge tube (predominant wave length about 4320°A) as the attractant. New Jersey mosquito traps with white Mazda type light were also used. In addition to light traps, bait pan traps employing a yeast-diamalt fermenting lure produced valuable records from western Stanislaus County. Larval sweepings from various cultivated and non-cultivated host plants at a number of localities also added to the distributional records.

In 1948 seven monochromatic traps were operated throughout the state and in 1949 ten traps were run. Certain lights were operated at the same localities during both years, while others were shifted to different places the second year. In this way comparative records for the two years were obtained from several localities while the remaining lights were used to determine the status of the two species at a variety of places.

In 1948 traps were operated at Berkeley, San Antonio Valley (Santa Clara County), Patterson (Stanislaus County), Dos Palos (Merced County), and Shafter (Kern County) in northern and

central California and captured a total of 5990 *Prodenia* adults. During the same period twenty-two bait pan traps located at Patterson captured 3030 additional specimens of *Prodenia*. The aggregate of 9020 moths collected north of the Tehachapi mountains during 1948 was entirely of *P. praefica*.

During the same year two monochromatic traps were operated in southern California, one at Corona and the other at El Centro. The latter functioned for only eleven days and captured no *Prodenia*. The Corona trap, however, was operated from April 1 to December 11 and produced twenty-three *Prodenia*. This was a mixed catch, consiting of ten *P. praefica* and thirteen *P. ornithogalli*.

In 1949 monochromatic light traps were again operated at Patterson and Shafter in northern California, but they were discontinued at Berkeley, San Antonio Valley, and Dos Palos. However, two of these traps were transferred to new localities, one at Ryer Island (Solano County) and the other at Gilroy (San Benito County). The four traps produced a total of 30,381 *P. praefica*. Twelve bait pans, again located in the Patterson area, captured 6395 *Prodenia* also all *praefica*. Thus, as was the case in 1948, the entire *Prodenia* catch from monochromatic light traps and bait pans, located north of Tehachapi mountains, was composed of *P. praefica*. In 1949 light trapping was expanded in southern California with a total of six monochromatic traps being used. These lights were located at Corona (Riverside County), Hemet (Riverside County), Port Hueneme (Ventura County), Bostonia (San Diego County), Meloland (Imperial County), and Blythe (Riverside County). As was the case in 1948, the catch was mixed consisting of fifty-three *P. praefica* and twenty-three *P. ornithogalli*.

SEASONAL DISTRIBUTION

Records obtained from the sampling devices used in the geographical distribution studies discussed above also supplied valuable information concerning the seasonal distribution of *P. praefica* and P. *ornithogalli*. Data obtained at Corona in 1948 indicate that the two species differ greatly in seasonal distribution. Operation of the Corona trap was not initiated until the first of April of 1948 and no data are available to compare the early season activity of the two species, but the trap was operated through the middle of December of that year and the record shows that

P. ornithogalli was active much later in the year than *P. praefica*. With *ornithogalli* six of the thirteen specimens trapped were taken after October 1, the last moth being captured on December 2, while with *P. praefica* no specimen was captured after September 11. Although this record of seasonal occurrence of the two species in southern California might seem scanty when based on such a small sample, it is strongly bolstered by the records from northern and central California which showed that practically no *P. praefica* moths were extant there after September 30. Furthermore, collection of *P. ornithogalli* larvae from an alfalfa field at Riverside on November 5, 1952, and from alfalfa on November 12, 1953, in Blythe, and on December 2, 1953 at San Diego, gives additional evidence of the late season activity of this species. The probable reason for the early cessation of activity by *P. praefica* will be discussed below.

Discussion

The intensive trapping activities conducted during 1948 and 1949, augmented by miscellaneous records, show that *Prodenia praefica* is widely distributed over the state of California (Fig. 2) while the closely allied *P. ornithogalli* is restricted to the area south of the Tehachapi mountains where the two species overlap in distribution, but maintain their identities. *P. praefica* occurs in great abundance in the area north of the Tehachapi mountains (particularly the Central Valley) while neither species is abundant in southern California.

The difference in the seasonal distribution of the two species probably results from differences in their overwintering habits. *P. praefica* is a temperate area species being native to western North America. It passes the relatively severe winters of its native habitat in a pupal diapause which commences in September following the fourth larval brood and lasts until the following January or February. This diapause appears to affect essentially all fourth brood specimens so that there are practically no moths extant after the end of September. *P. ornithogalli*, on the other hand, being a tropical species apparently has no true winter diapause and thus occurs in its various stages until the time of killing frosts. It most likely survives the winter in largest numbers in the pupal stage in the soil, but individuals may possibly pass the winter as larvae or adults in milder localities or in protected places.

SOME CALIFORNIA SPECIES OF HYPERASPIS NEW AND OLD

(Coleoptera:Coccinellidae)

BORYS MALKIN
University of Washington, Seattle

The material which forms the basis of this paper is from the California Insect Survey Collection, Department of Entomology, University of California, and was kindly lent to me by Dr. P. D. Hurd. Mr. Hugh B. Leech of the California Academy of Sciences loaned to me a number of specimens for comparison, from the collection of that institution.

Hyperaspis essigi Malkin, new species

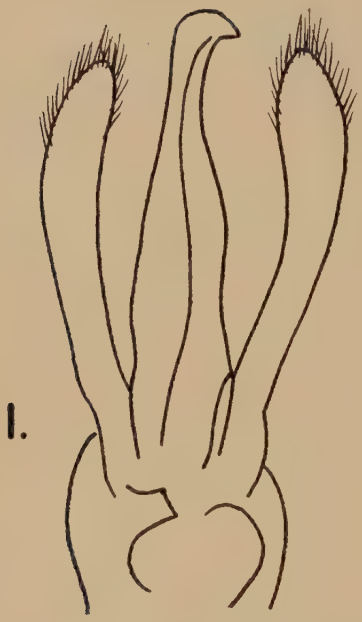
Broadly oval, highly polished, black. Head in male yellow. Thorax more than twice as wide as long with a broad marginal stripe on sides. Elytra slightly longer than wide, each with a large apical spot. Punctulation on dorsal surface strong, tending to be more feeble toward sides of thorax. Interstices smooth, non-alutaceous. Ventral surface black to piceous, epipleura black, inverted sides of thorax yellow. Prosternal carinae very strong, converging in middle and then running parallel to each other almost to margin of prosternum. Abdominal plates almost complete, extending almost to margin of second segment, flattened out and angular at apex. Legs piceous, tibiae rufous. Male genitalia: penis longer than the parameres, extremely slender and hooked at the apex. (fig. 1). Length: 3.5 mm.

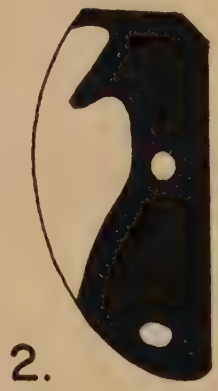
Holotype male, labeled: YOSEMITE, CALIFORNIA, June 26, 1926 (E. O. Essig collector) deposited at the California Academy of Sciences, Entomology Department.

This species greatly resembles *H. postica* LeConte, except for the extreme elongation of the penis and stronger punctulation of the dorsal surface and longer prosternal carinae. It might be added that the apex of the penis is more curved than in *postica* giving an impression of being a hook.

Hyperaspis taeniata bipunctata Malkin, new subspecies

This subspecies is close to *H. taeniata pallidula* Dobzhansky, from which it differs in having a discal spot on each elytron adjacent to the greatest extension of the marginal spot (fig. 2). From *H. taeniata taeniata* LeConte, it differs in having the abdominal plates very wide, less rounded, incomplete and running along the very margin of the segment. The prosternal carinae of *H. taeniata bipunctata* are strong but very short, converging and ending in the middle. The punctulation is more feeble than in typical *H. taeniata*. Length: 2.4 mm.





EXPLANATION OF FIGURES

Fig. 1, *Hyperaspis essigi* Malkin, male genitalia, ventral view. Fig. 2, *Hyperaspis taeniata bipunctata* Malkin, elytron.

Holotype male: GARRITY CREEK, CONTRA COSTA COUNTY, CALIFORNIA, September 16, 1936 (Ray F. Smith collector). In the California Academy of Sciences, Entomology Department.

HYPERASPIS MOERENS LeConte

A new state record is represented by a unique specimen collected by Prof. E. O. Essig at Berkeley, California, September 7, 1914. The extension of the range is remarkable, the species having been described from Lake Superior, Michigan and recorded also from mountainous regions of Montana and Wyoming.

HYPERASPIS LATERALIS WELLMANI Nunenmacher

Dobzhansky gives only state records from the U.S.N.M. collection. A single specimen from Amedee, Lassen County, California, July 4, 1947 (T. F. Leigh collector), represents then the first definite locality. The extension of the range is quite within the normal expectations, the form being quite common in the Great Basin region, especially in Oregon and Washington.

HYPERASPIS LATERALIS OMISSA Casey

Dobzhansky reports only one California record (3 specimens from Placer County). A specimen from Piñon Flat, San Jacinto Mountains, Riverside County, California, May 27, 1939, from *Pinus monophylla* (E. S. Ross collector), extends the range of the form to southern California.

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ADDITIONAL MOSQUITO RECORDS FROM UTAH

(Diptera:Culicidae)

DON M. REES AND LEWIS T. NIELSEN
University of Utah, Salt Lake City

The following new records, representing a genus previously unreported from Utah and three additional species of *Aedes* extends the number of species reported from the state to forty representing six genera. For previous records of mosquitoes in Utah consult the biliography. Unless otherwise indicated collections were made by the authors.

PSOROPHORA SIGNIPENNIS (Coquillett)

This species was known to occur in arid regions of the adjacent states of Wyoming, Colorado, New Mexico and Arizona and its presence in Utah had long been suspected. It was collected by personnel of Ecological Research, University of Utah, at Dugway, Utah. No larvae were collected, but the adult females were numerous and troublesome at the time collected. The presence of this species in the arid Great Salt Lake Desert region of northwestern Utah likely indicates a Great Basin distribution and further collections probably will reveal the species range as extending into Nevada and southern Idaho.

Tooele County: Dugway, August 4, 1953 (J. L. Eastin). Government Well, NW of Dugway Mountains, August 11, 1953 (H. E. Cott).

AEDES ATROPALPUS (Coquillett)

The appearance of this species in east central Utah represents the most northern extension of its range in western North America, having previously been reported in this area only from Arizona, New Mexico and Mexico. (Carpenter, et al, 1946). It is common in many regions in the southern, central and eastern United States and in southeastern Canada.

The larval collection in Utah, from which both adult males and females were reared, was made in rock holes, the typical larval habitat for the species. The rock holes were deep sandstone depressions located near the Colorado River. The Colorado River has served as a migratory route into Utah for many southern insect immigrants and it is probable that this is also the case with *Aedes atropalpus*. Suitable habitats for the species occur at intervals along the entire length of this river.

Grand County: Dewey, May 23, 1953 (J. R. Keller).

AEDES HEXODONTUS Dyar

This species which closely resembles *Aedes punctor* in all stages, is widely distributed in the mountains of northern Utah, occurring in both the Wasatch and Uintah Mountain ranges. At elevations above 8,000 feet it is one of the dominant *Aedes* species and in many localities becomes a severe pest during the months of June and July. The larvae have been found in a great diversity of habitats in pools of all sizes, but seem to show a distinct preference for shallow unshaded marshy pools containing *Carex* and grasses. Great numbers of larvae, often almost in pure cultures, have been found in such situations. The grass and *Carex* margins of permanent ponds and lakes also seem to be a favored habitat.

It Utah the species is most commonly associated with *Aedes cataphylla*, *Aedes communis*, *Aedes excrucians*, and *Aedes pullatus*.

Aedes hexodontus has been collected in the following localities during June and July.

Duchesne County: Grandaddy Lake, Mirror Lake. Salt Lake County: Alta, Big Cottonwood Canyon, Brighton. Sanpete County: Skyline Drive (Manti Canyon and Ephraim Canyon Summits). Summit County: Henry's Fork Lake, Trial Lake, Wall Lake. Uintah County: Paradise Park Reservoir. Wasatch County: Camp Cloud Rim, Soapstone Ranger Station.

AEDES SCHIZOPINAX Dyar

This rare species had previously been reported only from Madison and Gallatin Counties of Montana and Mammoth Hot Springs, Wyoming (Mail, 1934). Its presence in northern Utah is a considerable southern extension of its range and probably indicates a much wider distribution in the western United States than was suspected from its prior limited distribution records. Larvae were collected in overflow pools along a small stream and in several pasture pools filled by irrigation water. The immature stages of this species never have been encountered in large numbers. They have been found associated with *Aedes cataphylla, Aedes cinereus, Aedes increpitus* and *Aedes fitchii.*

Summit County: Chalk Creek, May 27, 1950. Wasatch County: Hailstone, April 18, 1948; May 6, 1950.

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A NEW GENUS FOR CYPHON ROBUSTUS LECONTE

(Coleoptera:Helodidae)

HUGH B. LEECH

California Academy of Sciences, San Francisco

Since its original description in 1875, *Cyphon robustus* LeConte has been retained in the genus *Cyphon* Paykull. However, it is not a *Cyphon* and does not fit any genus recorded from the Nearctic region, nor any described genus known to me.

Sarabandus Leech, new genus

Form oblong-oval, facies of *Elodes* (i.e. of such species as *E. fuscipennis* Guérin and *E. inornatus* Lewis), and somewhat of *Microcara* and *Pseudomicrocara*.

Head nearly vertical in repose, hidden by pronotum in dorsal view; mandibles simple, very broad, narowed and sharply pointed at apex, with a vague angulation near middle of inner margin, not toothed; labial palpi short, terminal segment glabrous, subcylindrical, a little longer than penultimate segment and arising from its apex; maxillary palpi moderately slender, terminal segment subcylindrical and a little longer than penultimate. *Pronotum* bisinuate basally, almost evenly semicircular anteriorly without indication of front angles, continuous margin of sides and front slightly reflexed. *Prosternum* narrow before front coxae, triangular between them basally, thence suddenly lower and blade-like, the short blade barely reaching mesosternum and hidden by contiguous apices of coxae. *Mesosternal process* narrow, reaching to about midpoint of middle coxae, not contacting metasternum; middle coxae normally contiguous apically; hind coxae contiguous. First segment of hind tarsi rounded above, not laterally margined; second segment not produced posteriorly, not hiding part of third.

Type of the genus: *Cyphon robustus* LeConte, 1875.

Sarabandus is separable from all described New World genera by the following combination of characters: hind femora much like those of front and middle legs, not greatly enlarged for leaping; mesosternal process short, narrow, not contacting metasternum, middle coxae thus able to be in contact in apical half; first segment of hind tarsi rounded above, not laterally margined. It resembles *Cyphon* in that the terminal segment of the labial palpus arises from the end of the penultimate segment, but differs in mesosternal characters, non-dentate mandibles, and shape of the pronotum. It is most closely allied to the Australian genus *Pseudomicrocara* Armstrong, 1953, but differs from this in its contiguous middle coxae, and shorter, pointed mesosternal process.

I am indebted to J. W. T. Armstrong for examples of *Pseudomicrocara* of which I have studied two species.

PACIFIC COAST ENTOMOLOGICAL SOCIETY

W. C. DAY	J. GORDON EDWARDS	D. D. JENSEN
Vice-President	*President*	*Secretary*

PROCEEDINGS

Two Hundred and Thirty-fourth Meeting

The two hundred and thirty-fourth meeting of the Pacific Coast Entomological Society was held at 7:30 p.m. on Friday, February 5, 1954, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Edwards conducted the meeting. The following members were present: Owen Bryant, H. B. Leech, K. S. Hagen, P. D. Hurd, Lee A. Wood, P. H. Arnaud, Ryuichi Matsuda, W. C. Day, V. D. Roth, J. W. Green, E. S. Ross, E. O. Essig, D. P. Furman, J. W. MacSwain, W. W. Middlekauff, D. J. Burdick, B. F. Eldridge, George Reichart, C. W. Hildebrand, H. H. Meyer, Hilary Hacker, T. S. Briggs, W. A. Doalin, E. L. Kessel, E. I. Schlinger, R. C. Bechtel, W. D. Murray, W. H. Lange, D. D. Jensen, and J. G. Edwards. Visitors were present as follows: Mrs. W. C. Day, R. Duncan Cuyler, M. Pitman, S. J. Carpenter, Lorelei Carpenter, Robert Langsten, James W. Chapman, Mrs. George Reichart, D. W. Walther, Albert A. Grigarick, Dana McLellan, and Mrs. Don Murray.

The minutes of the meeting held November 28, 1953, were read and approved.

The following were elected to full membership in the Society: Dr. John A. Chapman, Mr. L. E. Campos, and Mr. M. R. Wiemann. Vincent D. Roth and Bruce Eldridge were elected to student membership.

President Edwards appointed Paul Arnaud, Dr. Hurd and Dr. Ross to serve as a committee to select a site and make arrangements for the annual field meeting which will be held May 2.

Dr. Ross reported that the auditing committee had found the financial records of the Society in good condition.

Under the heading of new business, Dr. MacSwain suggested three changes in the handling of notes and exhibits which he thought might improve the present system. First that each individual, presenting a note or exhibit, prepare a brief statement as he wishes it to appear in the published proceedings of the society and turn this statement over to the secretary at the close of the meeting. Secondly that a slip of paper bearing the name of the individual and the nature of the note or exhibit be given to the chairman prior to the start of the meeting in order that the chairman might then call for the items in the order which he considers appropriate. Thirdly that the secretary in reading the portion of the minutes concerned with the notes and exhibits be empowered to refer to them solely by author and subject. In the discussion following the presentation of these proposals, Dr. MacSwain emphasized that these proposals were not intended to be strict rules and that many extemporaneous notes and comments were most welcome and could be handled as they have been in the past. The purpose of these proposals was to remove something of the awkwardness of the present system and to reduce the burden of the secretary. Dr. Edwards then suggested that these proposals

be introduced as a motion, following which the motion was seconded and unanimously passed.

In response to the President's call for notes and exhibits, Dr. Jensen reported that on July 29, 1953, in company with Paul Cook, a field of straight neck squash was found 6 miles north west of Yuba City, Calif., in which the western striped cucumber beetle, *Acalymma trivittata* (Mannerheim), occurred in moderate numbers. This insect has been shown by Dr. Freitag to be the vector of squash mosaic virus. On November 9, the field was revisited with Dr. Freitag. The population of beetles had increased to the point that several hundred were caught by sweeping the vines for approximately 1 hour. On December 29 the field was found to have been plowed. However, examination of several large valley oak trees growing around the field revealed that the beetles had congregated in tremendous numbers in the cracks of the bark and under the bark in places where it had been broken and permitted entry. They were most abundant in the deeper but narrower crevices. They seemed to be gregarious because only rarely did they occur singly or even in pairs. In a single crevice, numbers ranging from 10 to over 100 might occur with none being found in adjacent cracks. Five hundred beetles were collected with an aspirator in 15–20 minutes. The beetles also occurred around the base of the trees under leaves, rocks and litter. However, they were much less abundant here than on the tree itself. The beetles were also common in the cracks of telephone poles in the vicinity.

On February 2, 1954, Dr. Freitag, Dr. Ray Smith and Dr. Jensen visited the area again. Although most of the beetles had left the litter around the trees, their numbers on the oak trees seemed to be undiminished. They were on the trunks of the trees up to 1.7 miles from the field, but were not found four to five miles distant near the Sutter Buttes.

When disturbed the beetles immediately became active. The temperature was 50° F.

No western spotted cucumber beetles, *Diabrotica undecimpunctata undecimpunctata* (Mannerheim) occurred on the trees, but they were active in low numbers on the winter mustard.

Dr. Edwards urged the members to support the Coleoperist's Bulletin which is in danger of being discontinued because of inadequate financing.

Two sets of excellent colored slides were shown depicting living spiders and insects. Mr. Vincent Roth projected pictures taken of spiders in their natural habitats and Dr. Ross showed slides of *Epibembix*, the sand wasp, and its dipterous parasites, taken at Antioch, Calif.

Dr. Edwards then introduced Dr. Paul D. Hurd, of the University of California, Berkeley, who spoke on "The Nature and Extent of the Insect Fauna of Northern Alaska." Dr. Hurd's interesting account, which was accompanied by pictures of the region studied, is summarized below.

The insect fauna at Pt. Barrow, Alaska, because it represents the northernmost occurrence on the North American continent, presents an excellent opportunity for analysis and evaluation. Apart from its geographic location, the fauna is so constituted, owing to the limited ecological situation available for occupancy, that the roles of its various components may be interrelated and interpreted in terms of the environment. The physical aspects of the

environment such as topography, climate, and radiation, combined with biotic influences, have set the stage in such a manner that many of the major groups of insects (orders) are either unable to meet the requirements of their economies and hence are not present, or if present, only smaller groups (generally families, or often only species) have managed to derive their economy.

Dr. Hurd's talk was followed by a short discussion before the meeting was adjourned.—D. D. JENSEN, *Secretary*.

Two Hundred and Thirty-fifth Meeting

The two hundred and thirty-fifth meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, March 6, 1954, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Edwards conducted the meeting. The following members were present: F. E. Skinner, R. L. Doutt, K. S. Hagen, J. J. Drea, W. Thomsen, E. E. Gilbert, A. E. Michelbacher, E. O. Essig, Hilary Hacker, R L. Usinger, G. F. Ferris, L. R. Gillogly, P. S. Bartholomew, D. G. Denning, W. C. Day, T. S. Briggs, P. A. Harvey, E. S. Ross, K. F. Innes, Jr., G. M. Cagley, C. Kaufeldt, W. Hovanitz, J. W. Green, R. C. Miller, Otto W. Graf, Jr., J. W. Tilden, Laura Henry, H. B. Leech, Otto H. Swezey, J. G. Edwards, and D. D. Jensen. Visitors were present as follows: Mrs. Otto H. Swezey, Mrs. Lorin R. Gillogly, Alan Gillogly, James Gillogly, David Bartholomew, Grace Bartholomew, H. L. Day, James W. Chapman, and Loretta Denning.

The minutes of the meeting held February 5, 1954 were read and approved.

Lt. Carl L. Spear was elected to membership in the Society.

Dr. Usinger explained the financial problem confronting the Interim Secretariat of the International Commission on Zoological Nomenclature and reported that the Executive Board of the Society had authorized a subsidy in the amount of $50.00 for the Interim Secretariat.

In response to the President's call for notes and exhibits, Dr. Ross displayed living honey ants (repletes) which he had collected at Antioch March 5, 1954.

Mr. Leech said that he had reared the weevil *Trichomagdalis conspersus* Fall from dead branches of scrub oak *(Quercus wislizeni)* at Mill Valley, Marin County, California, and the malachiid *Anthocomus franciscanus* (Fall) from dying wild lilac *(Ceanothus thyrsiflorus)* infested with scolytids of the genus *Micracis*, also at Mill Valley.

Dr. Edwards exhibited larvae and 40 adults of *Ochthebius vandykei* from the intertidal zone at Moss Beach.

Dr. Usinger called attention to the fact that although it has been assumed for many years that there are five species of *Abedus* (Belostomatidae) in California, critical examination of the material indicates there is only a single species in the state.

President Edwards introduced Dr. Otto H. Swezey, retired former chief entomologist of the Hawaiian Sugar Planters Experiment Station, who spoke on the subject, "Some Aspects of the Endemic Insect Fauna of Hawaii." Dr. Swezey's talk, which was illustrated with slides, is summarized below.

It is generally known that the islands of the Hawaiian Group in mid-

Pacific are of volcanic origin, having been built up from the ocean floor by outpourings of lava from rift's in the earth's crust at sea bottom.

The endemic insect fauna has been produced by the operation of "Evolution of Species" from chance immigrants that arrived after the islands had become covered by vegetation. The high mountains of the main islands rise to elevations of 3,000 to 13,000 feet, and the slopes of the mountains are forested, except above about 8,000 feet. Many thousands of years resulted in the evolution of about 4,000 species of insects from the chance immigrants, and they are so different that it can not be determined from what regions they came.

The Kamehameha butterfly, *Vanessa tammeamea,* is an example of a species which has undoubtedly been present too short a time for the development of a series of species. This butterfly occurs on all of the forested islands, its spiny caterpillars feeding on the widely-distributed tree, *Pipturus* (or "mamake"), the bark of which was used by the Hawaiians in making their "tapa" cloth.

However, there are many genera in the various orders which are composed of many species apparently evolved from an immigrant species that had become established.

Among geometrid moths the genus *Scotorythra* has 34 species. Some of these occur only on a single island; and for most of those whose habits are known, their caterpillars feed on only one kind of tree.

The genus *Omiodes* in Pyraustidae has 21 species, each attached to a particular food plant; 5 of them on grasses; 3 on sedges; 6 on wild banana; 3 on *Astelia;* one on *Joinvillea;* one on *Erythrina;* one on *Vaccinium;* one on native palms in the mountains.

Phlyctaenia, another genus of Pyraustidae, has 24 species, and each, so far as known, has its own preferred food plant.

Hyposmocoma, a genus of Hyponomeutidae, has about 200 species. They are small moths with colorful wing patterns, whose habits are not thoroughly known, but the caterpillars of a good many of them live in cases on the bark of trees, feeding mostly on lichens. The caterpillars of a number of others are without cases and feed in dead twigs, etc.

In Cerambycidae, the genus *Plagithmysus* has 37 species. The larvae are tree-borers, and each species is attached to a particular kind of tree. Some kinds of trees have more than one species of borer attached to it, and the species are different on the different islands, i.e., no species occurs on more than one island.

The genus *Neoclytarlus,* in the same family, has 25 species, and they also are each attached to a particular tree, and each occurs on only one island.

The genus *Nesotocus,* in Curculionidae, is a large, elongate weevil with a long projected snout. It has 4 species, each on a separate island. The larvae are large, footless grubs which feed in and beneath the thick bark of *Cheirodendron* trees when the trees are in an unhealthy or dying condition, or in dead branches.

Rhyncogonus is a genus of leaf-feeding weevils whose larvae occur in the ground and feed on roots. There are 20 species, two of which are restricted

to food plants. Most of the others are rare and the host-plants are not known. Each species is on a single island.

Oodemas is a genus of roundish or oval, shiny weevils with about 50 species. The larvae feed in dead stems, especially of woody plants having copious pith. They are not particular as to host plant, but the majority of the species occur each on a single island.

Proterhinus is the only genus in the family Aglycyderidae. There are about 150 species, varying in size from 2 to 6 mm. They are wingless and the antennae are not elbowed, thus differing from the Curculionidae. So far as known, the species are mostly restricted to particular host plants. The larvae feed in and under bark in dead or dying twigs and in dead fern fronds. Three species are leaf-miners.

In the family Anobiidae, there are two genera, *Xyletobius* and *Mirosternus*, with very numerous species. They are very small beetles whose larvae feed in dead twigs and branches, and not much is known as to food plant restrictions. Many species are so similar that they are separated only with great difficulty. Apparently the species are not yet sufficiently established.

Nesoprosopis is a genus of small endemic bees with 52 species, the species being different on the different islands.

Odynerus is a genus of wasps with about a hundred species. They store caterpillars for larval food in hollow stems, exit holes where borers have issued from trees, and cavities in porous lava rocks. The species are different on the different islands.

These are some of the prominent examples of the many genera in the endemic insect fauna of the Hawaiian Islands, in which over long periods of time and isolation, numerous species have been evolved.

Following Dr. Swezey's address, the meeting was adjourned.—D. D. JENSEN, *Secretary.*

Two Hundred and Thirty-sixth Meeting

The two hundred and thirty-sixth meeting of the Pacific Coast Entomological Society was held at 7:30 p.m. on Friday, April 2, 1954, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Edwards conducted the meeting. The following members were present: E. O. Essig, A. E. Michelbacher, P. D. Hurd, H. B. Leech, Tom S. Briggs, W. C. Day, F. E. Skinner, E. S. Ross, R. L. Usinger, G. F. Ferris, Laura M. Henry, P. H. Arnaud, L. R. Gillogly, D. D. Jensen, J. G. Edwards, W. H. Lange, and E. I. Schlinger. Visitors were present as follows: Grace Hurd, Helen Day, G. L. Downing, Robert Z. Callaham, E. C. Clark, C. B. Eaton, Stephen Hitchcock, James Gillogly, Mrs. Lorin Gillogly, and Alan Gillogly.

The minutes of the meeting held March 6, 1954, were read and approved.

Mr. Lewis T. Nielsen and Mr. R. E. Darby were elected to membership in the Society.

Dr. Hurd reported that the annual field meeting of the Society would be held at Russelman Park, Contra Costa County.

In response to the President's call for notes and exhibits, Mr. Gillogly exhibited a dipterous pupa of the family Clythiidae (Platypezidae) collected by James Gillogly under the bark of a pine log in the Berkeley hills, March

25, 1954. Its identity is still uncertain, but it resembles the genus *Cleona.*

Mr. Leech reported that he had reared the following beetles lately:

Cerambycidae:

Holopleura marginata LeConte from dead *Umbellularia californica* at Mill Valley, Marin County, California.

Poecilobrium chalybaeum (LeConte) and *Neoclytus balteatus* LeConte from wild lilac *(Ceanothus thyrsiflorus)* at Mill Valley.

Phymatodes aeneus LeConte and *Callimius ruficollis* (Le Conte) from scrub oak *(Quercus wislizeni)* at Mill Valley.

Grammoptera molybdica LeConte from dead buckeye *(Aesculus californica)* from Redwood Creek two miles south of Muir Woods, Marin County, California.

Anobiidae:

Xarifa lobata Fall from dead willow *(Salix* sp.), Redwood Creek.

Hedobia granosa LeConte from dead oak *(Q. wislizeni)* at Mill Valley, and dead willow *(Salix* sp.) at Muir Beach.

Colored slides were shown by Professor Essig of Pingree Park, Colorado, by Dr. Edwards of Glacier National Park, and by Dr. Ross of a number of different insects.

President Edwards introduced as the main speaker of the meeting, Mr. Robert Z. Callaham, Forest Insect Laboratory, U. S. Forest Service, Berkeley, who presented an illustrated talk, which is summarized below, entitled, "Studying the Resistance of Hybrid Pines to Beetle Attack."

Pines have been the subject of intensive genetic study during the past three decades at the Institute of Forest Genetics, Placerville, California. In 1946, studies of host resistance to insect attack were incorporated into the research program at Placerville. At that time, Mr. John M. Miller of the Berkeley Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, was asked to cooperate in testing pines for insect resistance.

The pine reproduction weevil, *Cylindrocopturus eatoni* Buch., was selected for the initial studies. This weevil is responsible for the killing of young ponderosa and Jeffrey pines in plantations in California. Miller forced this insect to attack the many pine species available at the Institute, and he soon found that pines exhibit both interspecific and intraspecific resistance to this insect. This inherent resistance varies from complete immunity to a very high degree of susceptibility. Hybrids between resistant and susceptible pines usually were found to exhibit an intermediate degree of susceptibility.

In 1950, research efforts were directed toward determining the factors which govern the resistance of pines to their most important insect enemies, the *Dendroctonus* bark beetles. The results of these studies have led to the formulation of two hypotheses: (1) that the interspecific resistance of pines to *Dendroctonus* species is based on the kind of pitch which each species produces, and (2) that the intraspecific resistance is based on the amount of pitch which each individual tree produces. The validity of these two hypotheses currently is under investigation.

After a discussion of Mr. Callaham's report the meeting was adjourned. —D. D. JENSEN, *Secretary.*

Two Hundred and Thirty-seventh Meeting

The annual field meeting of the Pacific Coast Entomological Society was held at Russelman Park, Contra Costa County, May 22, 1954.

The recorded attendance of 54 persons included 21 members and 33 visitors. Members were present as follows: A. E. Michelbacher, E. O. Essig, Luciam Campos, R. M. Bohart, P. D. Hurd, E. S. Ross, D. D. Jensen, P. A. Harvey, W. H. Lange, J. W. MacSwain, Jane MacSwain, E. G. Linsley, R. F. Smith, R. Matsuda, P. H. Arnaud, Victor Stombler, W. C. Day, J. G. Edwards, Otto Swezey, H. B. Leech, and J. E. Swift. The following visitors were present: Marie Essig, Alicia de Campos, Margaret Bohart, Grace Hurd, Celeste Green, Pat Devant, Mike Green, Kathleen Green, Kathy McNulty, Mrs. E. S. Ross, Clark Ross, Anita Jensen, Diana Jensen, Doris Jensen, Patricia Jensen, Carol Jensen, Esther Perry, Jim Linsley, Juanita Linsley, Libby Smith, Mrs. W. C. Day, Margaret Arnaud, Alice Edwards, Mary Leech, Al Samulson, Mrs. O. H. Swezey, Grace Walsh, Jeannette G. Walsh, Mrs. Neil Pae, and Mrs. J. E. Swift.

The weather was ideal for outdoor activities and although some collecting was done, most of the time was spent in playing softball, volleyball, and in visiting.—D. D. JENSEN, *Secretary.*

Two Hundred and Thirty-eighth Meeting

The two hundred and thirty-eighth meeting of the Pacific Coast Entomological Society was held at 8:00 p.m. on Friday, November 12, 1954, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Edwards conducted the meeting. The following members were present: W. H. Lange, R. M. Bohart, A. E. Michelbacher, E. O. Essig, E. L. Kessel, L. R. Gillogly, R. F. Smith, E. G. Linsley, Jane MacSwain, J. W. MacSwain, Donald D. Linsdale, D. J. Burdick, J. D. Lattin, W. C. Bentinck, G. M. Cagley, R. C. Bechtel, Otto W. Graf, D. G. Denning, W. C. Day, K. S. Hagen, P. D. Hurd, J. W. Tilden, G. F. Ferris, Laura M. Henry, Tom S. Briggs, H. B. Leech, J. G. Edwards, and D. D. Jensen. The following visitors were present: Marie Essig, Martha Michelbacher, Mrs. Lorin R. Gillogly, James J. Gillogly, Alan R. Gillogly, Libby Smith, Juanita Linsley, R. D. Cuyler, R. O. Schuster, Marius S. Wasbauer, Ruth C. Wasbauer, A. A. Grigarick, Owen Bryant, Grace Hurd, George Provin, and Mrs. W. C. Bentinck.

The minutes of the meetings held April 2 and May 22, 1954, were read and approved.

The following were elected to membership in the Society: Robert Rosenstiel, Corvallis, Oregon; William Hovanitz, San Francisco; Marius Wasbauer, Berkeley; Gordon Samuelson, Concord, California; and Ryosuke Ishikawa, Japan.

President Edwards announced that the annual meeting of the Society would be held at 2 p.m., December 4, 1954, and that the Society, together with the Society of Systematic Zoology, will cosponsor two sessions for contributed papers at the national meetings of the American Association for the Advancement of Science which will be held on the campus of the University of California at Berkeley during the last week of December, 1954.

President Edwards appointed Professor Ferris, Dr. Kessel, and Dr. MacSwain to serve as a nominating committee to propose a slate of officers for 1955 at the annual meeting in December.

Dr. Hurd reported that the Society's second Memoir, "The Revision of the Spider Mite Family, Tetranychidae" by A. E. Pritchard and E. W. Baker, is now in the galley proof stage and should be off the press late in December or early in January, 1955.

The president and secretary briefly discussed some of the financial problems involved in publication of the second Memoir.

In response to the President's call for notes and exhibits, Mr. Gillogly presented the following note on the food habits of *Pocadius fulvipennis* Erichson, a nitidulid beetle which eats only puffball spores, and *Platydemia oregonense* LeConte, a tenebrionid beetle which was found in fungi but which has been reared on breakfast cereal. The *Pocadius* beetles were found near Marshall in Marin County last Spring. The larvae and adults eat only the spores of puffballs. Two species of puffballs grew on the pastures near Tomales Bay: *Calvatia maxima* and *Lycoperdon pyriforme*, and the beetles were found in each kind. Since then we have found miniature puffballs in our lawn, and the beetles accept these also.

The cultivated white-button mushrooms which we bought for the beetles were practically ignored. The beetles did not appear to relish them, and did not rear larvae in them. Field mushrooms and bracket fungi were not suitable either. There are not sufficient spores to support the nitidulid larvae. We set up trial jars with various other foods: wheat flour, rice flour, corn flakes, crushed oat cereal. The experiments were carried on for several months. Beetles living on water alone did as well as those in either of these other jars, for the beetles are apparently obligate puffball feeders.

In contrast, the tenebrionid, *Platydema oregonense*, although found originally in fungi in the forest, have shown a liking for various prepared cereals, with a great preference for "Cheerios". It has now been a year since our colony of *Platydema* has been without the host fungus, *Polyporus volvatus*, but they continue to rear larvae on "Cheerios" and water.

Dr. Tilden exhibited two beetles of the buprestid genus *Hippomelas*, and one beetle of the family Rhipiphoridae, which he had taken hovering over flowers of *Eriogonum*, in the Arroyo Bayo region east of Mt. Hamilton, Santa Clara County.

Mr. Day reported that during the spring and summer of 1954, he and Mrs. Day had collected some unusually interesting mayflies. They collected a good series of three species that are certainly new in North America north of Mexico. One of these, of very unusual appearance in the nymphal form, is apparently identical with an unnamed immature nymph from Brazil described by Traver as "Baetine No. 1." The reared imago from California indicates an aberrant form of *Baetis*. The other two species propably belong to two different genera—both have been reared and seem most closely allied to *Cloeodes*, described by Traver from Puerto Rico. Both genera have dipterous adults and belong to the highly specialized subfamily, Baetinea.

Dr. Kessel projected a series of excellent kodachrome slides showing

pictures of insects photographed in Marin County and an unusually large red mite collected in the San Jacinto Mountains above Palm Springs by Mr. Thomas Briggs.

Dr. Edwards exhibited a bottle of water containing living adults of *Amphizoa lecontei* which were collected in Glacier National Park, Montana. They were on a submerged stick in a cold, rapid mountain stream, which is their customary habitat. It is interesting that since they were collected in August and placed in this jar, they have remained alive for three months without food, without cold water, and without oxygenation of the water. Every 2 or 3 weeks the water is changed and immediately thereafter the beetles become temporarily more active. Attempts to feed them have failed, although beetles and larvae of this species feed well in captivity during July and August in Montana. This species does not occur in California, but is frequent in Montana, Idaho, Utah, British Columbia, and Washington. Dr. Edwards is considering the advisability of stocking a small stream in the Santa Cruz Mountains with them to see if they can survive under those conditions. The bubble at the tip of the abdomen is not obtained from the surface, but appears only after a minute or two of submergence, and is believed to be CO_2. Normally these beetles remain submerged for only 4 or 5 minutes, but one remained alive for almost two hours under water when prevented from floating to the surface.

Dr. Edwards also called attention to a new book entitled "The Language of Taxonomy" written by John Gregg.

Dr. Michelbacher reported that in October, 1954, maggots were observed seriously infesting the husks of English walnuts in Sonoma County. Some of the infested nuts were sent to J. E. Swift, Extension Entomologist, who turned the material over to Dr. Paul Hurd. Maggots that emerged were sent by Dr. Hurd to Dr. P. W. Oman, of the National Museum, for determination. They were identified by Dr. R. H. Foote as *Rhagoletis* sp., possibly *juglandis* (Cresson). The latter is the walnut husk fly, a serious pest of walnuts in southern California. It is a most difficult insect to control and has not been reported from northern California. At the present time all specimens have pupated. If the insect proves to be the walnut husk fly, it is hoped that climatic conditions may be such as to limit it as a pest.

Dr. MacSwain exhibited a box of insects collected in Mexico during the past summer. The major portion consisted of about 500 females of a number of nocturnal species of mutillids and tiphiids, which had been collected in a single day in a canyon five miles west of Parrita in Chihuahua. In addition were three females of the cucurbit—visiting bee *Xenoglossa fulva* Smith, whose nesting habits had been studied in an area 11 miles southwest of Acambaro, Guanojuato, Mexico.

Dr. Edwards introduced Dr. Larry Lange, University of California, Davis, as the main speaker of the meeting. Dr. Lange's talk dealt with aquatic Lepidoptera, particularly certain groups occurring in California. This is a field which has received relatively little attention in the past.

The subfamily Nymphulinae of the family Pyralidae includes a group of moths which have successfully and in devious ways made the change from a terrestrial to an aquatic environment. The Nymphulinae as usually

designated includes almost 100 genera and over 1,000 species, some aquatic, but many terrestrial. It appears that many are included in the subfamily only for convenience and do not constitute a group showing common phylogenetic relationships. In North America, our species have been included mostly in the genera *Nymphula* and *Cataclysta*, but it now appears that they are probably not properly placed if we take into account certain differences in male and female genitalia and wing venation. At the present time six species of aquatic moths are known from California, but unidentified larvae would indicate that there are additional species. The work to date suggests that a major revision of the genera is necessary in order to accommodate our western species, and that much biological and distributional data remain to be collected.

Following a discussion of Dr. Lange's report, the meeting was adjourned. —D. D. JENSEN, *Secretary*.

Two Hundred and Thirty-ninth Meeting

The annual meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, December 4, 1954, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Edwards conducted the meeting. The following members were present: P. D. Hurd, Jr., W. C. Day, E. L. Kessel, H. B. Leech, R. C. Miller, W. W. Middlekauff, E. O. Essig, W. A. Doalin, Laura M. Henry, G. F. Ferris, R. Matsuda, William Hovanitz, J. W. Green, J. W. Tilden, J. D. Lattin, E. A. Smith, Berta Kessel, Otto Graf, Jr., F. E. Skinner, William Barr, K. S. Hagen, J. W. MacSwain, and D. D. Jensen. Visitors were present as follows: G. Provin, R. D. Cuyler, Mrs. W. C. Day, Mr. and Mrs. George Johnson, C. W. Sharsmith, Peter Westigard, Alberta Woodworth, Alice Edwards, Jane Anne Edwards, Dorothy M. Ellis, F. Albert Ellis, Wm. Tamerlane, Lawrence Saylor, R. D. Schuster, R. G. Pisano, Ronald Hanley, Phyllis Baumann, Susan Westerbach, Samuel Carpenter, Margaret C. Irwin, Orlando Park, Geo. Hopping, and M. L. Prebble.

The minutes of the meeting held November 12, 1954, were read and approved.

The following were elected to membership in the Society: George Strubel, Charles B. Eaton, and Stephen Hitchcock.

Mr. Leech, chairman of the auditing committee, reported that the Society's financial records had been found in good order.

Dr. Miller, reported on the financial standing of the Society as of November 30, 1954.

Dr. Kessel showed a moving picture, entitled, "A Collection of Insects in Motion", which he had made of local insects for use in television work. Part of the film was in black and white and part in color. The results of his work indicate that moving pictures can provide a valuable medium for the presentation of insect life to the general public.

The nominating committee, consisting of Professor Ferris, Dr. Kessel, and Dr. MacSwain, proposed the following as officers of the Society during 1955: W. C. Day, President; H. B. Leech, Vice-president; D. D. Jensen, Secretary; R. C. Miller, Treasurer; Donald Denning, Member at Large.

The chairmanship of the meeting was then turned over to Mr. Day who called on Dr. Edwards to give his retiring presidential address entitled, "An Entomologist Considers the Ecology of Glacier National Park."

Dr. Edwards' address was illustrated with excellent kodachrome slides depicting the natural beauty of Glacier Park and showing the areas he considered of primary entomological interest.

Following Dr. Edwards' report the meeting was adjourned.—D. D. JENSEN, *Secretary*.